STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0123552
Owner:	Specialty Brands, L. P.; Windsor Frozen Foods
Address:	3355 W. Alabama St., Suite 730, Houston, TX 77098
Continuing Authority:	Specialty Brands, L. P.
Address:	#2 Industrial Dr., Piedmont, MO 63957
Facility Name:	Specialty Brands Wastewater Treatment Plant
Facility Address:	#3 Industrial Dr., Piedmont, MO 63957
Legal Description:	SE ¼, SW ¼, Sec. 3, T28N, R3E, Wayne County
Latitude/Longitude:	+3707199/-09042450
Receiving Stream:	McKenzie Creek (P)
First Classified Stream and ID:	McKenzie Creek (P)(02786)
USGS Basin & Sub-watershed No.:	(11010007-060001)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – Industrial Wastewater - SIC #2038
Sludge-only facility for no-discharge (land application)/dissolved air flotation (DAF)/(pretreatment) wastewater is discharged to the City of Piedmont's Sanitary sewer system/sludge from the dissolved air flotation system is stored in two vented steel tanks with a total volume of 38,000 gallons until land applied/secondary containment is provided for these steel tanks. Design population equivalent is 700. Design flow of sludge from the sludge generating facility into the storage tanks is 70,000 gallons per day. Actual flow is 34,250 gallons per day. Design sludge production is 243 dry tons/year. Actual sludge production is 146 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

December 9, 2005
Effective Date

Doyle Childers, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

December 8, 2010
Expiration Date

Gary L. Gaines, P.E., Regional Director, Southeast Regional Office

MO 780-0041 (10-93)

FACILITY DESCRIPTION (continued)

Outfall #001 - Land Application System Design

Receiving Stream Watershed: a gaining stream setting.

Facility Type: No-discharge Sludge Only Facility and Land Application System.

Other (describe): Sludge is hauled and land applied by a contract hauler.

Storage Capacity: Design storage for the sludge is 37 days at a generation rate of 1600 gallons/day.

Land Application:

Sludge Volume /year: 585,600 gallons; 243 dry tons/year
Application areas: 73 acres at current loading (116 acres total available)
Application rates/acre: 0.25 dry tons/application, 2.0 dry tons/year
Field slopes: less than 10 percent
Equipment type: tank truck
Vegetation: grass land

Additional Comments:

Outfall # 002: Storm Water
Legal Description: S 1/2, NW 1/4, Sec. 19, T29N , R5E, Wayne County,
Rings Creek at property line.

Outfall # 003: Storm Water
Legal Description: SW 1/4, NE 1/4, Sec. 19, T29N, R5E, Wayne County and
NW 1/4, SE 1/4, Sec. 19, T29N, R5E, Wayne County,
Rings Creek at property line

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 - Emergency discharge from storage tanks (Note 1)						
Flow	MGD	*		*	once/day**	24 hr estimate
Biochemical Oxygen Demand$_5$	mg/l		45	45	once/week**	grab
Total Suspended Solids	mg/l		45	45	once/week**	grab
pH – Units	SU	***		***	once/week**	grab
Ammonia nitrogen as N	mg/l	****		****	once/week**	grab
Nitrate/nitrite as N	mg/l	****		****	once/week**	grab
Temperature (degrees)	°C	****		****	once/week**	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2006 .						
Outfall #001 - Land Application Operational Monitoring (Notes 2 & 3)						
Volume Applied	gallons;	*			daily	total
	dry tons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches/ acre	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2007.						
Outfall #001 - Sludge Land Applied (Notes 4 and 5)						
Total Suspended Solids	mg/kg	*			once/quarter	grab
Total Kjeldahl Nitrogen as N	mg/kg	*			once/quarter	grab
Ammonia Nitrogen as N	mg/kg	*			once/quarter	grab
Nitrate/Nitrite as N	mg/kg	*			once/quarter	grab
Oil and Grease	mg/kg	*			once/quarter	grab
Total Phosphorus as P	mg/kg	*			once/quarter	grab
Chlorides	mg/kg	250			once/quarter	grab
Total Sodium	mg/kg	*			once/quarter	grab
Sodium Adsorption Ratio(SAR)	ratio	5			once/quarter	grab
pH – Units	SU	*			once/quarter	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2006 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfalls #002 – 003 - Storm Water Runoff (Note 6)						
Biochemical Oxygen Demand$_5$	mg/L	****			once/month	grab
Chemical Oxygen Demand	mg/L	****			once/month	grab
Total Suspended Solids	mg/L	****			once/month	grab
Total Kjeldahl Nitrogen as N	mg/L	****			once/month	grab
Ammonia Nitrogen as N	mg/L	2.0			once/month	grab
Nitrate/Nitrite as N	mg/L	3.0			once/month	grab
Chlorides	mg/L	****			once/month	grab
Oil and Grease	mg/L	****			once/month	grab
Total Phosphorus as P	mg/L	****			once/month	grab
Fecal Coliform	#/100mL	****			once/month	grab
pH Units	SU	****			once/month	grab
Temperature (degrees)	°C	****			once/month	grab
Total Boron	mg/L	****			once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2006 .						
Outfall # 002 – 003 - Stream Monitoring (See Special Condition # 4)						
Ammonia nitrogen as N	mg/L	****			once/month	grab
Nitrate nitrogen as N	mg/L	****			once/month	grab
Dissolved Phosphorus as P	mg/L	****			once/month	grab
Temperature (degrees)	°C	****			once/month	grab
pH Units	SU	****			once/month	grab
Dissolved Oxygen	mg/L	****			once/month	grab
Total Suspended Solids	mg/L	****			once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2006 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

PERMIT NUMBER MO-0123552

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Soil Monitoring (Note 7)						
Ammonia Nitrogen as N	mg/kg	*			once/year	composite
Nitrate/Nitrite as N	mg/kg	*			once/year	composite
Chlorides	mg/kg	*			once/year	composite
Oil and Grease	mg/kg	*			once/year	composite
Available Phosphorus as P (Bray 1-P method)	mg/kg	*			once/3 years	composite
Total Sodium	mg/kg	*			once/3 years	composite
Exchangeable Sodium Percentage	%	10			once/3 years	composite
pH Units	SU	6.0-7.5			once/3 years	composite
Cation Exchange Capacity	CEC	*			once/3 years	composite
Organic Matter	%	*			once/3 years	composite

MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2007 .THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

MO 780-0010 (8/91)

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only.

** Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.

*** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.0 pH units.

**** Comply with water quality standards per Special Condition #3.

Note 1 - **No-discharge facility requirements**. Sludge shall be stored and land applied during suitable conditions so that there is no-discharge from the storage site or land application site. An emergency discharge may occur when excess wastewater has accumulated above feasible land application rates due to precipitation exceeding the 1-in-10-year 365 day rainfall or the 25- year 24-hour storm event. The emergency discharge shall not cause a violation of water quality standard general or specific water quality criteria in 10 CSR 20-7.031.

Note 2 - Records shall be maintained and summarized into an annual operating report which shall be submitted by January 28th of each year. See Special Conditions.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Note 3 – Storage basin freeboard shall be reported as basin water level in feet below the overflow level. See Special Conditions for Land Application System requirements.

Note 4 - Sludge that is land applied shall be sampled at the storage basin or application vehicle.

Note 5 - Monitor once per quarter in the months of March, May, July and October.

Note 6 - Monitoring during the first hour after a discharge from a rainfall event greater than 0.2 inch in a 24 hour period. Storm water runoff samples shall be collected for each storm water discharge point and the sample from each outfall shall be tested separately.

Note 7 - Sample the top 6 to 12 inches of soil. Composite samples shall be collected from each land application site and each soil type in accordance with University of Missouri publication G9110, Sampling Your Soil for Testing. Testing shall conform to Soil Testing Procedures for North Central Region (North Dakota Agricultural Experiment Bulletin 499-Revised); Methods of Soil Analysis, American Society of Agronomy, Inc; Soil Testing and Plant Analysis, Soil Science Society of America Inc; EPA Methods; or other methods approved by the department.

C. SPECIAL CONDITIONS

1. Report as no-discharge when a discharge does not occur during the report period.

2. Outfalls must be marked in field and on the topographic site map submitted with the permit application.

3. Water Quality Standards
   a. Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
   b. General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
      (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

C. SPECIAL CONDITIONS (continued)

4. Reopener Clause

a. This permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified limitations or other conditions pertaining to phosphorus application rates to soils, the adequacy of wastewater lagoon liners, or other special conditions as may be necessary to protect waters of the state.

b. Comprehensive Nutrient Management Plan. The permit may be modified or reopened to require submittal of a Comprehensive Nutrient Management Plan CNMP) in accordance with USEPA and USDA guidelines and regulations or where determined appropriate by the department to meet water quality standards for nutrients. This determination may be based upon ambient water quality monitoring, Section A monitoring requirements and other applicable information.

c. This permit may be reopened and modified, or alternatively revoked and reissued, to:

(1) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

(A) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

(B) controls any pollutant not limited in the permit.

(2) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.

(3) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

5. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

(1) One hundred micrograms per liter (100 ug/L);

(2) Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

(3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;

(4) The level established in Part A of the permit by the Director.

b. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

C. SPECIAL CONDITIONS (continued)

6. Annual Report. (Outfall #001)
An annual report is required in addition to the quarterly reporting under Section A of this permit. The annual report shall be submitted by January 28 of each year for the previous growing season from October 1 through September 30 or an alternate 12 month period approved by the Department and listed in the Operation and Maintenance Manual. This report shall be submitted using report forms approved by the Department and shall include a summary of the monitoring and record keeping required by the Special Conditions and Standard Conditions of this permit. The report shall include the following:

a. Record of maintenance and repairs performed during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;
b. The number of days the facility has discharged during the year, the discharge flow, the reasons discharge occurred and effluent analysis performed; and
c. A summary of the land application operations including storage basin freeboard at the start and end of the application season, the number of days of land application for each month, the total gallons and dry tons applied, the total acres used, crops grown, crop yields per acre, the application rate in gallons/acre per day and gallons and dry tons/acre for the year, the monthly and annual precipitation received at the facility and summary of testing results.

7. Sludge Land Application System – Industrial Sludge_ . (Outfalls #002 & #003)

a. Land Application Design – No-Discharge. Design and operation shall be in accordance with 10 CSR 20-8.020(15). Permittee shall operate the land application system in accordance with the design parameters listed in the Facility Description section of this permit. Sludge shall be stored and land applied during suitable conditions so that there is no-discharge from the storage site or land application site. An emergency discharge may occur when excess wastewater has accumulated above feasible land application rates due to precipitation exceeding the 1-in-10-year 365 day rainfall or the 25- year 24-hour storm event. The emergency discharge shall not cause a violation of water quality standard general or specific water quality criteria in 10 CSR 20-7.031.

b. Metals Loading Limitations. Application of trace metals shall not exceed the concentrations and loading limits for each metal as specified in University of Missouri publication WQ 425, revised 4/95. When metals concentrations exceed values in Table 2 of WQ-425, the remaining metals capacity of the site will be calculated each time biosolids are spread. When the cumulative limit is reached, biosolids addition will be halted.

c. Storm Water Runoff. There shall be no contaminants discharged from the land application sites by storm water that cause violation of the Water Quality Standards rules for general criteria and specific criteria under 10 CSR 20-7.031.

d. Discharge Reporting. Any unauthorized discharge from storage, treatment or land application system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.

e. Land Application Site Locations. The permittee shall land apply only to suitable sites located within the overall property boundaries and descriptions listed in the permit application and approved Operation and Maintenance Manual. Permittee requests for additional sites including non-owned property must follow permit modification procedures prior to land application. To request additional sites, the permittee should submit a revised application Form A and R, mailing addresses for first down stream land owners of each site, topographic maps and other pertinent information for the proposed sites.

C. SPECIAL CONDITIONS (continued)

7. Sludge Land Application System – Industrial Sludge. (Outfall #002 & 003)(continued)

f. Subsurface Injection Requirement. Subsurface Injection or immediate incorporation after surface application should be considered where feasible and practicable to reduce exposure to wash off by storm water runoff and to retain nutrients in the soil for crop requirements. Surface application may be used when practical in accordance with procedures in the approved Operation and Maintenance Manual.

g. Saturated/Frozen Conditions. There shall be no land application during frozen, snow covered, or saturated soil conditions. There shall be no application on days when there is observation by operator of an imminent or impending rainfall event. An on-site visual investigation of the field's soil moisture condition, followed by testing of the soils, will be made to determine whether land application can occur. The visual and soil test procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.

h. Buffer Zones. There shall be no land application within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal and within 150 feet of dwelling. For surface application, there shall be no land application within 100 feet of gaining streams (Class P and C classified streams listed in Water Quality Standard rule under 10 CSR 20-7.031); 50 feet of wet weather gaining streams and tributaries (unclassified streams); or 50 feet of the property line. For subsurface injection, buffer zones may be reduced to 25 feet from gaining streams (classified and unclassified).

i. Application Equipment. The application system shall be operated so as to provide uniform distribution of wastes over the entire land application site. Land application shall occur only during daylight hours. The application system shall be capable of applying the annual design flow during an application period of less than 100 days or 800 hours per year.

j. Equipment Checks during Land Application. The application system and application site shall be visually inspected at least once during land application to check for equipment malfunctions and runoff from the application site.

k. Biosolids Transport. Biosolids will be hauled to the application site by highway tanker trailer. Any spillage from the transporting operation must be cleaned up immediately, and the quantity spilled must be reported within twenty-four (24) hours.

l. Public Access Restrictions. Public access shall not be allowed to the land application site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(b)(5).

m. Fact Sheets. Fact sheets shall be prepared for each application site giving the following information. Land owners name, address, telephone number, acreage, designation of buffer zones around limiting features, nutrient content of biosolids and the application rates with the maximum per year. The actual boundaries of the allowed land application locations will be marked on each site prior to the injecting of biosolids.

n. Daily Log Sheets. Daily log sheets shall be prepared and kept for each application site showing amounts of biosolids applied per acre, dates of application, nutrients applied, and crop yields.

o. Construction of Biosolids Storage. If additional biosolids storage facilities become necessary, a construction permit shall be obtained before construction of such facilities begins, and the facilities shall be built in accordance with the appropriate regulations and design guides.

C. SPECIAL CONDITIONS (continued)

8. Nutrient Management

a. Nitrogen. The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
b. Phosphorus. When soil test phosphorus (P)levels are above 120 pounds per acre using Bray P-1 test method, the sludge application rate shall not exceed the annual crop requirements for available phosphorus in accordance with state NRCS guidelines. When state NRCS standards and guidelines become available, the permit will be revised to include the Phosphorus Threshold and Phosphorus Index methods to be developed under the USDA, NRCS National Policy, General Manual, Part 402.06.
c. The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual sludge and soil testing results and crop requirement. If crop yields are less than that predicted in the permit application, the application rates must be reduced or the yields increased through appropriate changes in management practice.
d. This permit will be modified to require a Comprehensive Nutrient Management Plan(CNMP) after promulgation of applicable EPA rules and guidelines. The CNMP will replace the current PAN and phosphorus methods.

9. Plant Available Nitrogen (PAN) Procedure

a. Wastewater, sludge and fertilizer nitrogen applications shall not exceed the crop nitrogen requirements based on realistic crop yield goals and the Plant Available Nitrogen (PAN) method. The wastewater application rate shall be calculated as follows:

PAN = CNR - SRN – CFN

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.
CNR = Crop Nitrogen Requirement in pounds N/acre
PAN = Plant Available Nitrogen in wastewater and sludge expressed as annual pounds N/acre.
SRN = Soil Residual Nitrogen in pounds N/acre.

b. Plant Available Nitrogen(PAN) is calculated as follows:

PAN = [Ammonia Nitrogen] x [Availability Factor]
+ [Organic Nitrogen] x [Availability Factor]
+ [Nitrate Nitrogen] x [Availability Factor]

Note: For anaerobic treated wastewater and sludge, the nitrate nitrogen amounts will be negligible and can be ignored.

c. Plant Available Nitrogen (PAN) Availability factors are as follows:

C. SPECIAL CONDITIONS (continued)

9. Plant Available Nitrogen (PAN) Procedure (continued)

1. Average Availability factors for all fields:

Type of Nitrogen	Surface Application	Immediate Incorporation or Subsurface Injection
Organic	0.25 - 0.75*	0.25 - 0.75*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

***** Organic Nitrogen = [Total Kjeldahl Nitrogen as N] - [Ammonia as N]. Availability Factors based on time after application and waste type are:

Type of Wastewater and Sludge Treatment Methods	Availability Factor by Time Period Year 1	Year 2	Year 3	Cumulative Year 3+
Aerobic wastewater lagoon and sludge	0.20	0.10	0.05	0.35
Anaerobic wastewater lagoon and sludge	0.40	0.20	0.10	0.70
Aerobic sludge-only storage basin/lagoon	0.40	0.20	0.10	0.70
Extended aeration plant and sludge	0.40	0.20	0.10	0.70
Waste activated treatment plant (liquids, primary/secondary sludges)	0.40	0.20	0.10	0.70
Lime Stabilized Sludge	0.40	0.20	0.10	0.70
Aerobic Sludge Digester	0.30	0.15	0.08	0.53
Anaerobic Sludge Digester	0.20	0.10	0.05	0.35
Composted Sludge (Class A)	0.10	0.05	0.03	0.18

NOTES: Year 1 is the current year of waste application; year 2 is the previous year of waste application; and year 3 is waste application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when waste is applied in consecutive years. The cumulative factor is used when waste is applied at about the same rate for 3 consecutive years or longer.

****** Average inorganic nitrogen availability based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for all fields or may adjust the N availability based on site specific soil conditions using the following tables under ‘Field Specific Availability Factors for Inorganic Nitrogen’.

C. SPECIAL CONDITIONS (continued)

9. Plant Available Nitrogen (PAN) Procedure (continued)

2. Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factor on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

Table A. Alternate Field Specific Availability Factors for Surface Application

Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
	% of inorganic N (manure., precip.) available				
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19

Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH),April 1992, Tables 11-6 and 11-8.

Table B. Alternate Field Specific Availability Factors for Sub-Surface Injection or Immediate Incorporation.

Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
	% of inorganic N (manure., precip.) available				
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24

Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH),April 1992, Tables 11-6 and 11-8.

d. Soil Residual Nitrogen (SRN).

1. For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

SRN in pound N/acre* = [percent organic mater] x Soil Availability Factor

Soil Availability Factor by Soil CEC Ranges and Organic Matter

Growing Season	Organic Matter	CEC 10	CEC 10-18	CEC >18
Summer	1%	40*	20	10
Winter	1%	20*	10	5

***Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pounds nitrogen for summer and 30 pounds for winter.

2. For Perennial Crops the SRN is considered zero(0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.

C. SPECIAL CONDITIONS (continued)

9. Plant Available Nitrogen (PAN) Procedure (continued)

2. Field Specific Availability Factors for Inorganic Nitrogen (continued)

e. Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.
f. If a crop is not harvested, the PAN rate shall not exceed 40 lbs./acre/year and grass vegetation must be maintained on the site.
g. PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.
h. Conversion Factors for laboratory testing results:
[mg/L or mg/kg or ppm] x [conversion factor] = [pounds per Unit Volume]

Unit Volume	Conversion Factors
lbs./acre inch	0.226
lbs/1,000 gallons	0.0083
lbs/100 cubic feet	0.0062
lbs./ton (wet wt)	0.002

i. Alternate nitrogen availability factors may be considered based upon site specific conditions for each field and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
j. Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
k. Primary reference publications used herein are:

1. National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
2. Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc., 1991.
3. Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December, 1992.
4. Land Application of Sewage Sludge, EPA/831-B-93-002b, U.S. Environmental Protection Agency, December, 1994.

10. Operation and Maintenance Manual

The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to the departments Water Pollution Control Program and Regional Office for review and approval. The O&M Manual shall include, but not limited to, the following:
a. Detailed topographic maps of the property showing all land application fields including the identification numbers for each field and tract. Each field and tract shall have an identification number for record keeping and tracking purposes. The maps shall also indicate separation distances from streams, ponds, wells, and property lines and shall indicate areas exceeding 10 percent slopes and other areas that are not suitable for land application. The maps shall also include the location of all buildings, storage structures, containment structures, domestic wastewater treatment systems and other waste handling units.

C. SPECIAL CONDITIONS (continued)

10. Operation and Maintenance Manual (continued)

b. Procedures for providing the separation distances required by this permit and as specified in 10 CSR 20-8.020 (15) (B).
c. Sample collection, preservation, and testing procedures.
d. Record keeping forms for tracking each field, tract and storage structure. This shall include testing results, crops, yields, and application rates for each field. Records for each field and tract shall include dates and amounts applied.
e. A procedure for promptly reporting spills or discharges to the permittee plant manager and to DNR.
f. A procedure for routine visual inspections of the storage and application system for overflows or other operational problems.
g. A program for routine, unannounced inspections of land application sites and records to ensure that all directives for land application from the permittee's central office are being followed. Records of the inspections shall be maintained by the permittee and made available to the department upon request.
h. A procedure to assure that all appropriate employees are properly trained in operation of the waste systems and are familiar with the O&M Manual.
i. Procedure for adjusting application periods and rates based on soil infiltration capacity, soil moisture content, and percent of soil field (saturation) capacity.
j. List of number, size, and capacity of waste removal, hauling and land application equipment.
k. Number of suitable days each year when land application will occur based on historical one in ten year wettest precipitation and capacity of spreading equipment and personnel available.
l. Procedure to avoid application if there is a weather forecast for significant precipitation within 24 hours.